Thermæ, &c.; and modern Gothicisms (except the one or two that are vaulted) are the Palladianisms of our little private Renaissance. Some, doubtless, will be very well satisfied in such company as Palladio; some, I am convinced, will not.

If Providence spares us our excellent friend Ruskin long enough, and cures him of some few crotchets, he will presently convince more people than you expect, that in all these things the motive of imitation is "base" and "unmanly." It is to *save the trouble of thinking out* and elaborating the kind of construction really employed that men have recourse to dressing it up in paltry representations of a former kind. Every style in which this is done is base from the outset, and, instead of progressing, is in a state of *continual decline throughout its career*. Can any observer deny that this has been the case with the ancient Roman, the high Gothic, from the time of Edward II. (or at least III.), and the Renaissance everywhere? Well, draw your conclusion. Some are expecting progress by following a similar method.

Your correspondent, Mr. J. B. Waring, should therefore think again before reasserting that no style can be called debased till it ceases to display art or afford scope for genius. Some of the greatest geniuses ever devoted to our art (certainly the most known and celebrated ones) have wrought only in debased styles, and only furthered their debasement. Let him remember that, however much self-constituted judges may have differed as to what is or is not debased in *our* art, there is at present a pretty unanimous agreement among sound critics on *all other* arts, that art of any kind is debased in which the non-essentials supersede or usurp the place of essentials. Mind that. There is *no dissent* about it in the professors or writers on any art but architecture. Moreover, Mr. Ruskin is showing you, or about to show you, or means to show you,—or if he does not, I will,—that this debasement, and *all* art debasement, whether here or abroad, in Christian countries, has originated in one source, and that one a source commonly supposed favourable to the fine arts. And I would warn that gentleman, as I know he does not like being forestalled, that if he does not make haste and come to the gist of his argument, I will take a short cut which I see, and tell it before him; which I should be sorry to have to do, because I know he will do it much better.

It is also necessary to receive with extreme caution the pretty saying now general, and echoed, I see, by an eminent professor, in your last number (where you did not qualify it), that we are to look for beauties and not for defects, in the works we may be studying. The time is fully come, Sir, for no longer searching out *either*,—either *beauties* or *defects*, but directing our whole attention to *one* beauty or *one* defect, viz., to fundamental right or fundamental wrong. And I am quite sure I shall not be singular in saying that this searching out beauties of detail, in works fundamentally fallacious, has been the grand bane of our modern practice; and you know what it has brought us to. And this error, this detail beauty-hunting, is now spreading into far more important things than art, and, if encouraged, will work more mischief than I can tell you; aye more than the Renaissance architecture itself.

But I have gone beyond my original object, which was only to reassert the "vaulting fallacy" complained of in the *Gentleman's Magazine*, because its re-statement was necessary as a foundation to the remarks on window tracery which I promised you, and will presently send. G. L. GARBETT.

THE NEW CARRIAGE-ROAD IN HYDE-PARK.—The new carriageway, which runs from the Marble Arch to Grosvenor-gate, is now completed and thrown open to the public. Railings are being put down, and a broad gravel path is to run along the side. The old carriage-road is being filled up, and other improvements and alterations are to be made.

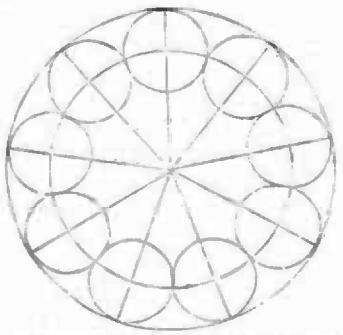
METHODS OF INSCRIBING ANY NUMBER OF CIRCLES IN A CIRCLE TO TOUCH ONE ANOTHER, AND ALSO THE CIRCUMFERENCE OF THE CIRCLE IN WHICH THEY ARE INSCRIBED.

IT is a subject of amusement sometimes to witness the attempts made by *architectural* and *mechanical draughtsmen*, to inscribe a specified number of circles within another circle, in such a manner, as mutually to touch one another, and also the circumference of the circle proposed.

To those who are unacquainted with the principles of geometry, the thing is usually accomplished by trials, and the labour necessarily incurred by doing it in this way is very great, especially when the number of inscribed circles is considerable; and for this reason, a simple and ready method of obtaining the centres and radii of the inscribed circles must, to practical draughtsmen, be a matter of very great importance; and it is this consideration that has induced the writer to draw up the present paper, and if the information which it contains be found useful to practical men, his object will be answered.

PROBLEM.—*In a given circle, to inscribe any number of circles, to touch one another, and also the circumference of the given circle.*

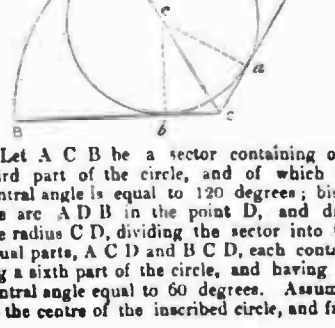
In resolving this problem, it becomes necessary to conceive the given circle to be divided into as many equal sectors as there are circles proposed to be inscribed in it, and in this way the problem resolves itself into the following: viz.—



In a given circular sector, to describe a circle that shall touch the radii and arc of the sector.

The problem thus limited is rendered very simple, and it is this limitation that practical men are apt to overlook, for if it happens to occur to them, the labour is vastly circumscribed, being confined to the consideration of one sector only, the number of sectors being the same as the number of circles proposed to be inscribed, and each circle is inscribed in the same way.

In the first place, therefore, we shall suppose that three circles are proposed to be inscribed in a given circle, in such a manner as mutually to touch each other, and also the circumference of the given circle: in this case the sector to be considered will occupy a third part of the original or given circle, and its central angle will contain 120 degrees.



Let A C B be a sector containing one-third part of the circle, and of which the central angle is equal to 120 degrees; bisect the arc A D B in the point D, and draw the radius C D, dividing the sector into two equal parts, A C D and B C D, each containing a sixth part of the circle, and having the central angle equal to 60 degrees. Assume c as the centre of the inscribed circle, and from c let fall the perpendiculars c a and c b upon the radii C A and C B; then is C D equal to each of the perpendiculars c a and c b, so that the inscribed circle will touch the three points D, a and b, the radii C A and C B being tangents.

To investigate a rule for determining the radius of the circles proposed to be inscribed, it becomes necessary to have recourse to algebra; but from the nature of the problem, the steps of that science required in the solution are of a very simple character, and are as follows:—

Let R = C D the radius of the given circle, in which others are to be inscribed; n = the number of circles proposed to be inscribed in the given circle; ϕ = A C D, half the angle of the sector containing the inscribed circle; and x = c a, c b, or c D, the radius of the circle required to be inscribed in the given one.

This notation being established, the solution of the problem offers no difficulty; for the triangle C a c being a right angle, and C c its hypothenuse equal to $(R - x)$, we have, by the principles of plane trigonometry, the following analogy, viz.:—

Rad. : $R - x$ :: sin. $\frac{1}{2}\phi$: x; therefore, by equating the products of the extreme and mean terms, and resolving the equation, we get $x = \frac{R \sin. \frac{1}{2}\phi}{1 + \sin. \frac{1}{2}\phi}$. This equation denotes the radius of the inscribed circle, or the distance of its centre from the circumference of the given circle; but the expression for the distance between the centre of the given circle, and that of the circle required is more simple; and it is, moreover, more convenient in the practical construction of the problem, as it represents the radius of a circle in the circumference of which all the centres of the inscribed circles are found. The expression for this radius, or the value of C c, is, therefore, as follows, viz.: $C c = \frac{R}{1 + \sin. \frac{1}{2}\phi}$, where $\phi = \frac{360°}{n}$.

RULE.—*Divide 360 degrees by the number of circles proposed to be inscribed in the given circle, and the quotient will be the central angle of the sectors containing the inscribed circles. Divide the radius of the given circle by unity, added to the natural sine of half the central angle, and the quotient will be the distance between the centres of the given and the inscribed circles.*

This rule is sufficiently simple and explicit, but its import will be better comprehended from the solution of the following numerical example.

EXAMPLE.—Let it be required to inscribe nine circles within another circle whose diameter is two inches, in such a manner that they shall mutually touch each other, and the circumference of the circle proposed.

Here the number of circles to be inscribed is nine, and consequently the central angle of the sector is 40 degrees, for $\phi = \frac{360}{9} = 40°$ and its half is 20°, whose natural sine increased by unity, is 1.342; hence we have $C c = \frac{1}{1.342} = 0.745$: with this decimal as a radius taken from the scale of construction, describe a circle interior and concentric with the given one. Divide the circumference of the given circle into nine equal parts of 40 degrees each, and draw straight lines from the centre to each point of division, and these lines will cut the circumference of the inner circle in points that are the centres of those required to be inscribed, the radius being that part of the straight lines intercepted between the two concentric circles, with which the required circles may be described as per figure.

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NATIONAL FREEHOLD LAND SOCIETY.—In reply to the advertisement for a surveyor issued by this society, there were forty-five applications. Eight were selected for consideration, and from these our old correspondent, Mr. James Wylson, was ultimately elected to the office.

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